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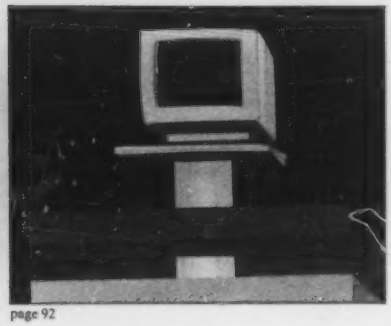

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Cindy Charles

Courtesy Novell Inc.

Bruce Smith (left) at Network Equipment Technologies and Ray Noorda at Novell led their troops to big years.

PERFORMANCE REPORT

Communications: Connectivity finally connects

User demands for connectivity finally made the 'year of the LAN' a reality. But for old-line communications vendors, last year was less than stellar.

by Lee Keough

Connectivity has become more than a buzzword in the past year. Corporations seeking to leverage investments in existing information systems bought networking products by the bushel; as a result, vendors of T-1 multiplexers or local-area networks watched sales soar. But for those selling more conventional communications products, such as modems and statistical multiplexers, the year was less than awe inspiring.

The 35 largest communications equipment vendors showed a moderate 14 percent growth, about the same as in recent years. Individual market segments—as well as individual vendors within those markets—demonstrated widely divergent results, however. Carriers grew only 3 percent, in part due to regulatory constraints on pricing. At Novell Inc., a vendor of local-area network operating systems, and Network Equipment Technologies, a T-1 multiplexer maker, revenues grew at a blistering pace for the 12 months ending June 30. Novell and NET weren't the only suppliers able to capitalize on the networking trend; most of their competitors recorded impressive sales and profits.

The spectacular growth of networking products is most obvious in the LAN market. After struggling with slim profits and lackluster sales for some time—and touting each successive year as the "year of the LAN"—LAN vendors finally started turning the corner at the end of 1986. Bill Redman, an analyst with the Gartner Group Inc. in Stamford, CT, estimates that the LAN market doubled in 1986, to $1 billion. He pegs sales in 1987 at $1.25 billion.

"Three years ago, the question was, 'Should we or shouldn't we install LANs?' " says Redman. "But once systems vendors endorsed the idea by either providing LANs themselves or providing gateways, the market just took off." Once-raging debates over the merits of different types of LANs have also subsided, notes Brian Ne-Smith of Network Strategies Inc., a Fairfax, VA, consultancy.

Certainly, LANs offer many more features than they did just a few years ago. LAN software has moved beyond the simple document transfer stage and now affords powerful electronic-mail functions, gateways into wide-area networks, and improved user interfaces. More importantly, MIS now backs the LAN concept. "MIS departments see micro LANs as viable, and they've taken control from the workgroup," says Mark Caulkins, vice president of corporate marketing for Novell, whose Netware

'87	'86	Company	'87 Revenues (000)	'86 Revenues (000)	% Growth
		Equipment and Services			
1	1	Northern Telecom Inc. *(Nashville, TN)*	**1,374,310**	1,222,930	12
2	2	The Racal Electronics Plc *(Bracknell, England)*	**520,401***	485,970*	7
3	3	Motorola Inc. *(Schaumburg, IL)*	**465,000**	428,000	9
4	5	Centel Corp. *(Chicago)*	**295,097***	235,966*	25
5	4	Paradyne Corp. *(Largo, FL)*	**241,954**	251,181	-4
6	8	Bolt Beranek and Newman Inc. *(Cambridge, MA)*	**233,841**	178,049	31
7	6	Dynatech Corp. *(Burlington, MA)*	**231,567****	205,773**	13
8	9	General Datacomm Industries Inc. *(Middlebury, CT)*	**201,313**	174,482	15
9	7	Micom Systems Inc. *(Simi Valley, CA)*	**199,630**	189,308	5
10	10	Digital Communications Associates Inc. *(Alpharetta, GA)*	**181,399**	150,705	20
11	12	Mitel Inc. *(Boca Raton, FL)*	**162,450****	149,700**	9
12	14	Timeplex Inc. *(Woodcliff Lake, NJ)*	**147,170**	119,118	24
13	11	Hayes Microcomputer Products Inc. *(Atlanta)*	**140,000****	150,000**	-7
14	16	Ungermann-Bass Inc. *(Santa Clara, CA)*	**129,487**	90,343	43
15	22	Novell Inc. *(Provo, UT)*	**127,855**	60,099	113
16	13	Western Union Corp. *(Upper Saddle River, NJ)*	**123,200**	130,400	-6
17	21	3Com Corp. *(Santa Clara, CA)*	**110,377**	63,992	72
18	15	Network Systems Corp. *(Minneapolis)*	**109,543**	95,985	14
19	17	Gandalf Technologies Inc. *(Manotick, Ontario)*	**100,295**	83,322	20
20	18	Infotron Systems Corp. *(Cherry Hill, NJ)*	**77,366**	76,753	1
21	20	Ericsson Inc. *(Richardson, TX)*	**63,753***	69,299*	-8
22	24	Tellabs Inc. *(Lisle, IL)*	**59,669**	51,775	15
23	27	Bridge Communications Inc. *(Mountain View, CA)*	**59,218**	37,966	56
24	34	Network Equipment Technologies *(Redwood City, CA)*	**58,028**	14,808	292
25	23	Penril Corp. *(Rockville, MD)*	**56,346**	52,239	8
26	25	Icot Corp. *(San Jose, CA)*	**51,050**	45,064	13
27	19	Sytek Inc. *(Mountain View, CA)*	**40,000**	70,000	-43
28	26	Corvus Systems Inc. *(San Jose, CA)*	**36,053**	42,137	-14
29	28	Fibronics International Inc. *(Hyannis, MA)*	**34,927**	28,282	23
30	30	Telematics International Inc. *(Fort Lauderdale, FL)*	**32,721**	20,000	64
31	29	Anderson Jacobson *(San Jose, CA)*	**26,500****	23,000**	15
32	31	US Robotics Inc. *(Skokie, IL)*	**25,000****	20,000**	25
33	35	Excelan Inc. *(San Jose, CA)*	**22,049**	9,907	123
34	33	Multi-Tech Systems Inc. *(New Brighton, MN)*	**20,000***	15,260*	31
35	32	Avant-Garde Computing Inc. *(Mt. Laurel, NJ)*	**17,358****	16,309**	6
		Total Equipment and Services	**5,774,927**	5,058,122	14
		Carriers			
1	1	AT&T *(New York)*	**34,478,000**	35,185,000	-2
2	3	Nynex Corp. *(New York)*	**11,730,000**	10,749,800	9
3	2	Bell South Corp. *(Atlanta)*	**11,686,900**	11,206,500	4
4	4	Bell Atlantic *(Philadelphia)*	**10,194,200**	9,488,400	7
5	5	Ameritech Corp. *(Chicago)*	**9,385,900**	9,207,700	2
6	6	Pacific Telesis *(San Francisco)*	**8,975,000**	8,799,000	2
7	7	U.S. West Inc. *(Englewood, CO)*	**8,372,100**	8,052,200	4
8	8	Southwestern Bell Corp. *(St. Louis)*	**7,740,200**	7,943,900	-3
9	9	MCI Communications Corp. *(Washington)*	**3,737,000**	3,132,000	19
10	10	United Telecommunications Inc. *(Kansas City, MO)*	**2,857,227***	2,805,751*	2
11	11	Contel Corp. *(Atlanta)*	**2,756,560**	2,496,088	10
12		US Sprint Communications Co. *(Arlington, VA)*	**2,301,896**	N/A	N/A
13	12	Allnet Communication Services Inc. *(Birmingham, MI)*	**449,734***	432,113*	4
		Total Carriers	**114,664,717**	109,498,452	3†
		Total Communications	**120,439,644**	114,556,754	

is the most popular software running on LANs. Novell, the largest and one of the best-performing LAN vendors last year, decided to de-emphasize its hardware offerings and concentrate on developing more functionality for its software package, which runs on almost all LANs.

Caulkins envisions new growth once Novell's Netware becomes available for Apple Macintosh networks and Unix-based LANs. He adds that Netware may soon offer networking features that mainframe systems software vendors now provide, such as security, network management, and job accounting.

Novell's primary competitor, 3Com Corp., is taking a different tack. In September, 3Com merged with Bridge Communications Inc., which specializes in multivendor LANs and connections to wide-area networks. L. William Krause, 3Com's president and CEO, says the merged company, which will carry the 3Com name, will emphasize "workgroup systems"—

Total '87 Revenues (000)	Total '87 Profits (000)
4,739,000	316,900
2,065,355	73,085
5,888,000	194,000
1,418,821	109,802
241,954	(43,282)
233,841	(8,029)
304,693	23,205
201,313	4,814
199,630	13,450
181,399	28,433
340,005	60,400
147,170	19,508
150,000	N/A
129,487	5,513
127,855	14,809
889,192	(531,205)
110,377	11,146
109,543	17,206
100,295	N/A
77,366	(6,490)
4,633,000	310,000
119,337	8,792
59,218	6,449
58,028	7,666
56,346	4,959
51,050	7,950
40,000	N/A
36,053	(19,780)
34,927	(1,235)
32,721	5,164
N/A	N/A
25,000	N/A
22,049	N/A
20,000	N/A
17,358	(6,427)
34,478,000	404,000
11,730,000	1,229,900
11,686,900	1,594,900
10,194,200	1,203,400
9,385,900	1,134,000
8,975,000	1,059,000
8,372,100	947,200
7,740,200	983,900
3,737,000	(451,000)
3,058,783	180,561
3,070,049	228,576
2,301,896	N/A
449,734	(60,780)

**CY '86 and '85 **FY N/A Not Available*
All other revenues are calculated using the four fiscal quarters ending closest to June 30.
†Total growth rates are based only on known comparative revenues.

GAINING STRENGTH . . .

Company	'87 Revenues (000)	% Growth	'86 Revenues (000)
1 Network Equipment Technologies	58,028	292	14,808
2 Excelan	22,049	123	9,907
3 Novell	127,855	113	60,099
4 3Com	110,377	72	63,992
5 Telematics International	32,721	64	20,000
6 Bridge Communications	59,218	56	37,966
7 Ungermann-Bass	129,487	43	90,343
8 Bolt Beranek and Newman	233,841	31	178,049
9 Multi-Tech Systems	20,000*	31	15,260*
10 Centel	295,097	25	235,966

. . . LOSING GROUND

Company	'87 Revenues (000)	% Growth	'86 Revenues (000)
1 Sytek	40,000	-43	70,000
2 Corvus Systems	36,053	-14	42,137
3 Ericsson	63,753*	-8	69,299*
4 Hayes	140,000**	-7	150,000**
5 Western Union	123,200	-6	130,400
6 Paradyne	241,954	-4	251,181
7 Southwestern Bell	7,740,200	-3	7,943,900
8 AT&T	34,478,000	-2	35,185,000
9 Infotron Systems	77,366	1	76,753
10 United Telecommunications	2,857,227*	2	2,805,751*

**CY '86 **FY*

DECISIONS chart

file servers and operating systems. "We are taking a total systems approach," says Krause. To compete with workstation vendors, 3Com will have to provide superior price/performance numbers, he acknowledges.

Analysts say competition will get much stiffer as major hardware vendors incorporate LAN capabilities into their products. "The key issue is how soon and how well systems vendors address the market," says David L. Terrie, president of Newport Consulting, Scituate, MA. Redman predicts the market will begin to change as early as next year. "IBM, for example, will put the Token-Ring Network on a chip set and package it inside the Personal System/2 in 1988," he speculates. "We'll also see a [Digital Equipment Corp.] DECnet board on the MicroVAX." Terrie expects such moves to lead to tremendous price cuts for LAN hardware, causing an industry shakeout. "The bottom won't fall out immediately," he says, "but we'll see a major shift in emphasis by 1989 and 1990."

IBM to turn up the heat

Other analysts suggest that Novell may start feeling some heat from IBM and Microsoft Corp (Redmond, WA). Microsoft's announced Operating System/2 LAN Manager and IBM's OS/2 Extended Edition are expected to offer many of the features now included in Netware. "The LAN Manager has more potential for the future than Netware has," offers Will Zachmann, vice president of International Data Corp., Framingham, MA-based market researchers. Redman, however, asserts that the operating systems will lag behind Netware in offering features. He adds that even if those operating systems perform many of the same functions, they won't displace Netware.

Not all LAN vendors scored successes last year. Corvus Systems Inc. and Sytek Inc. both struggled through the year. Corvus's troubles stemmed largely from its decision to manufacture IBM-compatible micros and disk drives. Although Corvus still sells micros, including a machine based on the Intel 80386 processor, it has cut back on its involvement in the workstation business. After a major restructuring that included a large layoff, Corvus recently announced its first profitable quarter since 1985. Sytek, maker of IBM's broadband-based PC Network, continues to suffer from the loss of IBM's business since IBM switched to Token-Ring Network as

its standard LAN architecture. Sytek once boasted annual sales as high as $95 million; last year, its revenues only reached about $40 million.

A clearer picture

The market for private T-1 networks doesn't appear to have as many question marks as the LAN market. Observers say the T-1 multiplexer market should continue to grow. But only a handful of vendors have been able to capitalize on the boom in private corporate networks.

The fastest-climbing of all communications vendors is Network Equipment Technologies, which has experienced nothing short of an astounding sales growth of nearly 300 percent in one year. Bruce D. Smith, president, expects growth to slow to about 80 percent this year—still beyond the dreams of most vendors. Few analysts doubt NET will achieve that mark. Its strengths are in marketing and the multiple-node switching capability it offers in its T-1 mux.

Observers say NET and Cohesive Network Corp., owned by Digital Communications Associates Inc. of Alpharetta, GA, sell the most feature-rich T-1 systems. Timeplex Inc., the T-1 mux vendor with the largest installed base, is trying to catch up with its newly announced Link 100 mux. NET has another ace up its sleeve, however; it recently signed a marketing and development deal with IBM. "We've gone from 50 to 5,000 sales reps," says Smith. "IBM is going to help us in development, so our signaling protocols will be built into SNA."

Analysts say NET will benefit from the "stamp of approval" its affiliation with IBM provides. But Victoria Brown, senior vice president of marketing for Timeplex, contends the benefit may not be great at all. "NET has turned its business over to IBM," she says. "Of course, we expect the agreement to influence some users." Brown is quick to point out that in the past IBM has had difficulty making its partnerships work.

Timeplex plans to position itself as the vendor best able to implement global networking, says Brown. She sees AT&T, which is beginning to offer many private networking features in its Accunet T-1.5 service, as a major competitor. George Colony, president of Forrester Research Inc. of Cambridge, MA, also views AT&T as a threat to T-1 mux vendors.

Courtesy AT&T

Vittorio Cassoni, senior vice president of AT&T's Data Systems Division, faces the task of helping to get the carrier's subpar performance back on track.

Unlike many observers, Colony doesn't believe that private networks will continue to grow unabated. He projects that the T-1 market, which he says is becoming saturated, will grow only 15 percent next year, compared with the 35 percent growth he estimates for this year. Colony says his survey of large users shows that they are interested in private backbone networks for fairly narrow applications. He believes private networks have already been installed for most of those applications, and says the next boom in private networks will come in several years, when T-1 customers move to install T-3 services.

Others assert that the T-1 market has yet to peak. "We're just starting to see global networks growing," says Jack Grubman, an analyst with Paine Webber Inc., a Wall Street brokerage. He says that better price/performance ratios are making private networks feasible for more companies. "As the price of bandwidth drops, more features are being added to muxes, while prices remain the same," he notes. "More customers will flock to T-1 networks."

While the LAN and T-1 markets flourish, other communications sectors founder. Sales of modems, private branch exchanges, and statistical multiplexers are flat, and profits are being squeezed due to the commodity status of these products. The trend, say analysts, will continue. That spells more trouble for U.S.-based vendors, which are not well equipped to be low-cost manufacturers. To compete, U.S. companies will have to stay on the leading edge of technology or offer greater service. Observers contend that the only way modem and stat mux vendors can improve their fortunes is through strategic alliances with T-1 multiplexer manufacturers.

The slowest growing communications market last year was the carrier segment. Particularly hard-hit are the non-Bell carriers, which have to stay within the price umbrella set by regulations and competition but lack the mammoth customer bases to absorb upgrade costs. Bell regional holding companies all turned in handsome profits last year. Nynex Corp. and Bell Atlantic Corp. in particular posted impressive gains, thanks largely to the healthy Northeast economy.

Grubman says comparing the performance of the Bell regionals on the basis of revenues is misleading because of differing state regulations. Instead, he uses message units as a yardstick to gauge performance. Under that criterion, Bell Atlantic, Nynex, and Pacific Telesis are by far the strongest of the Bell regionals. "Bell South, which was thought to have the greatest potential for growth, has lagged because its growth is nearly all residential," Grubman notes.

AT&T faces a unique set of problems: It has been a notable flop in the computer business, it is likely to lose market share to lower-cost competitors, and it has faced stiff competition in telephone equipment sales from vendors like Northern Telecom Inc. and IBM/Rolm. Grubman, however, says AT&T's dismal performance is somewhat misleading. It was due mostly to a $3 billion write-down that the vendor took at the end of 1986. The write-down stemmed from large inventories of computers, high layoff costs, and the tight PBX market. AT&T's long-distance business is still in good shape, says Grubman.

AT&T isn't alone in feeling the long-term effects of tariff deregulation. Other carriers—some of which encouraged the deregulation of rates—are finding it harder to make a profit. Deregulation is also the major factor driving the installation of private networks—a trend that should continue in the year ahead. D

Laura Daly, a free-lance editor based in Maywood, NJ, contributed to this performance report.